

Galileo Revisited: Conflicting Worldviews or Perceived Differences?

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Abstract

This article examines the issue of how “established” positions can lead to misinformed views, which in turn result in mistrust and lack of cooperation between individuals as well as communities. Our goal will be accomplished by revisiting the Galileo affair. I will attempt to show that the accepted view that this episode is simply an example of the antagonism between science and religion is incorrect and misleading. I will then discuss some general lessons we can learn from our study of Galileo. I will conclude our paper with the application of these lessons to the topic of this Round Table: The Two Cultures: Perceived or Real?

Introduction

First impressions are so important, so lingering. For instance, people often ask: Can Christianity be trusted to improve the world today despite the ghost of the Crusades and the Inquisition? Can science and religion become partners in the midst of allegations of interference and irrational—even unethical—practices made by one realm against the other? Can the Humanities overcome obstacles—perceived or real—to combine efforts with the Sciences to insure this planet is inhabitable for the next millennium? All the questions posed must be addressed yet how often proactive and cooperative answers prove to be elusive in light of what has been offered as “reasons” not to engage or dialogue with the “other side.”

Of course such suspicion is what brings us together for this Round Table. What we may walk away with is not what seems to rule the day. The opening questions reflect battlegrounds that seem to simmer endlessly with emotions, accusations and *ad hominem* arguments. Having participated in a previous Round Table (summer 2008) I can testify that those in attendance have ably and accurately identified the problem and offered reasonable and practical solutions.¹ Yet, I am not encouraged that the world at large—as reflected in the public square—has moved any closer to dismantling the walls that separate ideas and—more importantly—people from each other. It is in that context that we gather today and offer ourselves and our ideas in order to heal what divides our world. Such a proactive strategy is necessary to overcome the disastrous results of campaigns by a vocal few that have imposed their individualistic wills on the masses who depend on such people to act for the good of everyone.

In that light I offer some modest thoughts to help identify what we are up against. In this paper I propose to show that often we allow what seems to be the popular or accepted way of understanding problems—including long standing feuds—to cloud our thinking both when assessing certain problems as well as identifying those players who should be our allies instead of our enemies. My plan is to review the events surrounding the Galileo affair, with the intent to offer an interpretation that counters the popular understanding of this famous—or as some

¹ See *Forum on Public Policy* 4 (Winter 2008).

would say—infamous event. I then will identify some lessons to be learned, which in turn, will be applied to our present day situation—the controversy between the Humanities and the Sciences. In offering this paper I acknowledge that I write from the perspective of the Christian tradition. I share this knowledge as means to indicate that the religious ideas pertaining to the time of Galileo are familiar territory for me. Moreover, as my professional title indicates, I am a member of the “Arts and Humanities” culture; nonetheless my goal is to present insight that offers hope to and incentive for both cultures—the Arts and the Sciences—to embrace each other in order to help this world be a safe and flourishing place to live.²

The Galileo Affair

When one considers the issues involved with the “gulf of mutual incomprehension” between C. P. Snow’s two cultures—the Sciences and the Humanities—I have found it beneficial to examine a part of the topic in order to better understand the whole. The part or area I have found useful in analyzing Snow’s overall description of the two components of society is the current relationship between science and religion.³ Both disciplines represent respectively the Sciences and the Humanities, and insights gleaned from an examination of their relationship can shed light on our topic at hand. Arguably this relationship mirrors one of the most persistent problems in any interdisciplinary discussion and—as Snow described—in society in general.

Any discussion of the relationship between science and religion should begin with a basic understanding of how the two interrelated in the scientific revolution (15th and 16th centuries).⁴ And from a study of this time period one is led immediately to the scientist Galileo Galilei (1564-1642) and all the events and myths surrounding what has come to be known as the “Galileo affair.”⁵ This affair refers to the events from 1613 to 1633, culminating with the trial and condemnation of the “Father of modern science” by the Inquisition.⁶ Often this event has been cited as the beginning of the confrontation between science and religion.⁷ But this conclusion has been severely criticized, mainly in light of the 1633 trial: Galileo was not condemned because of his science but because he disobeyed a Church decree of 1616.⁸

² Before assuming my position in the Religion department fulltime, I taught half time in the Mathematics Department as well the Religion Department.

³ By science I mean that discipline which observes and conducts experiments on our natural world, with the intent of learning more about it through an organized and structured methodology. I understand religion to be the worship of and belief in a Supreme Being (e. g., the God of Christianity), guided by a sacred text (in this case the Bible).

⁴ Nield, “Scientific Revolution: see below “Lessons from Galileo.”

⁵ Even this label is indeterminate for some; does it describe one trial or two? See Finocchiaro, *Galileo Affair*, 325 n.1; I want to add that Finocchiaro’s text provides an invaluable resource for English translations of all the relevant documents for the Galileo affair.

⁶ *Ibid.*, 1.

⁷ In retrospect I was guilty of false first impressions.

⁸ Schirmacher, “The Galileo affair”; see Finocchiaro, *Galileo Affair*, 1-43; Harrison, “History of Science/Religion”; McGrath, *Science & Religion*, 12.

As early as 1597 Galileo was convinced that the sun was the center of our universe (heliocentric theory)⁹ not the earth (Ptolemaic theory).¹⁰ However he did not originally make public his belief that Copernicus was essentially right for fear of how he would be perceived, especially by his fellow professors.¹¹ But even when he went public with his support of Copernicus in 1613 there was no imminent risk of confrontation with the Church over this new way to view our universe.¹² The leading Jesuit astronomers supported the Copernican theory and held that the Ptolemaic position was untenable.¹³ Moreover, Copernicus's *Revolutions* was not placed on the Index of forbidden books until 1616, and then it was only suspended until 1620, simply requiring some minor changes. It would take a remarkable series of events in Galileo's life to set in motion what would eventually result in his trial and permanent house arrest in 1633. What is important here is to see how the relationship between science and religion—while pertinent for understanding the Galileo affair—is not the main reason for the dispute.

Even though Galileo's public support of Copernicus did not appear initially to set him on a collision course with the Church, it sent out an alarm to some that a confrontation was possible.¹⁴ The plausibility of Copernicus's theory was enhanced by a growing consensus that the belief that the earth is the center of the universe was indefensible. However a trend emerged in that conservative scientists and theologians looked beyond science to retort: biblical and religious arguments were assembled to counteract such heresy.¹⁵ An indication in 1615 that not all was well comes in the form of friendly letter between the Grand Duchess Christina and a former student of Galileo, Benedetto Castelli. Her concern was whether Galileo's teaching was compatible with the Bible. Informed of the Duchess' concern by Castelli, Galileo wrote a letter to the latter to refute any biblical objection to the heliocentric theory.¹⁶ The issue was this: the

⁹ The theory, sometimes called the Copernican Theory, was proposed by the Polish astronomer Nicolaus Copernicus (1473-1543). He promoted the model that the sun is the center of the universe, with the planets (including the earth), revolving around the sun in circular fashion. As Galileo understood it, this model included the belief that earth rotates on its axis; an emphasis on the rotation of the earth was described as the geokinetic theory.

¹⁰ Heavily influenced by Aristotle, Claudius Ptolemy's (90-168 C. E.) theory that the earth was the center of the universe and that the planets and stars (including the sun) revolved around the earth dominated the view of our universe until the 16th century; this theory is also called the geocentric theory.

¹¹ This fear was expressed in personal correspondence from Galileo to Johannes Kepler (1571-1630); see Koestler, *Sleepwalkers*, 361-363. Galileo's fear paralleled that of Copernicus, for the latter's book, *Concerning the Revolutions of the Celestial Bodies*, was not published until the year of his death, 1543; see Schmidt, *How Christianity*, 226.

¹² His early works include the *Star Messenger* (1610) and *Sunspot Letters* (1613). His position had been bolstered somewhat by his use of the telescope in 1609 though it appears that Galileo never had demonstrable and conclusive proof of his position; see Blackwell, *Science, Religion and Authority*, 25. Though the earlier book helped Galileo secure the position of Chief Philosopher and Mathematician in the court of the Grand Duke of Tuscany, it was his latter work which provided explicit evidence of his support of Copernicus; Machamer, *The Cambridge Companion*, 19-20.

¹³ "The Jesuits themselves were more Copernican than Galileo was," Custance, *Science and Faith*, 154; see Koestler, *Sleepwalkers*, 432-33.

¹⁴ This is not to imply that Galileo was unaware of potential theological debates surrounding his findings.

¹⁵ Finocchiaro *Galileo Affair*, 27.

¹⁶ *Ibid.*, 49-54; subsequently, Galileo expanded (from 8 to 40 pages!) on his letter to Castelli in a "Letter to Grand Duchess Christina"; see *ibid.*, 87-118.

Ptolemaic theory is supported by biblical passages while the heliocentric appears to contradict them. Of issue was how the heliocentric theory aligned (or not) with Scripture. Of note are two biblical passages, one from Joshua 10:12-14 and the other from Psalm 19:4-6. The first passage describes the warrior Joshua leading Israel in battle and it is reported that the “sun stopped in mid-heaven, and did not hurry to set for about a whole day (NRSV).”¹⁷ In the Psalm we have the picture of the sun running “its course with joy. Its rising from the ends of heavens, and its circuit to the end of them (NRSV).”¹⁸ In response to accusations that he opposed the sanctity of Scripture—such as just mentioned—Galileo argued that while Scripture cannot err those who interpret can, especially if every passage is interpreted literally. For him Scripture was inspired by the Holy Spirit but those who interpret Scripture in disagreement with conclusive scientific proof may not be inspired. Moreover, the Bible and nature both come from God, with the former instructing us in terms leading to salvation while the latter is for us to investigate and learn about. Galileo did not think Scripture and science contradicted each other.

Galileo follows Augustine’s (354-430 CE) lead here: there are two “books” to study in order to find the truth—nature and the Bible.¹⁹ God may be found in Scripture as well as nature.²⁰ There is no real conflict between science and religion seen here. But care must be taken not to always interpret every scripture literally.²¹ Augustine noted that sometimes both science and religion make claims about the physical world and thus warned against making any statements in the name of Christianity based on the Bible that appear to go against what is “certain from reason and experience.” To make such statements is “talking nonsense” and proves to be “an embarrassing situation” in that it shows “vast ignorance” to non-Christians.²² Overall, caution should be the rule for applying Scripture to discussions of the physical world.

Augustine was writing from the Aristotelian position that natural science can provide absolute truth. This led the early Christian theologian to say that when reason and experience conflict with traditional interpretation of Scripture then the interpretation should be revised to align with science. If, on the other hand, science is not absolutely certain then preference should be given to the accepted biblical explanation. On the whole then, it would appear that religion has the upper hand at this point unless science could produce “certainty.”²³

¹⁷ The thought here is—as I see it—that the sun would only stop if it regularly orbited the earth; if—as Galileo proposed—the earth rotated as it orbited around the sun, such a description was literally impossible.

¹⁸ Here there is a clear reference to the sun—not the earth—moving.

¹⁹ As Cardinal Baronius remarked, “The intention of the Holy Spirit is to teach us how one goes to heaven, and not how the heavens go.”

²⁰ This thought was supported in Galileo’s day as Dominican philosopher Thomas Campanella strongly defended Galileo’s right to pursue his new discoveries; Blackwell, *Science, Religion and Authority*, 20

²¹ Augustine struggled with the problem of reconciling Genesis 1 (description of the 6-day creation) with what he knew of science. It is from his *The Literal Meaning of Genesis* that Augustine offers some guidelines for interpreting scripture. See also McGrath, *Science & Religion*, 4-6, 9-11.

²² See McMullin, “Galileo,” for insightful discussion of Galileo’s approach to biblical interpretation.

²³ This of course leaves open the issue of what to do when a scientific claim tentatively suggests what might be proven true in the future as was the Galileo case; Blackwell, *Science, Religion and Authority*, 19.

Galileo's interpretation of biblical passages such as the two mentioned above set in motion a series of events that would lead to what some would call his first trial.²⁴ By the time he defended his position in his "Letter to the Grand Duchess Christina" the Inquisition was already responding to allegations of heresy against several people, including Galileo: some pastors (e. g., Friar Tommaso Caccini) believed his beliefs contradicted the Bible.²⁵ In what proved to be a key event Cardinal Robert Bellarmine, a consultant to the Inquisition, was drawn into the situation because of a letter sent to him by Paolo Antonio Foscarini in support of Galileo. The Cardinal responded to Foscarini by saying as long as Galileo's theory is described as *hypothetical* (or better *suppositional*) there was no problem.²⁶ Bellarmine conceded to Augustine's maxim about the Church needing to correct or revise positions based on valid scientific proof; but for him such convincing evidence had not been produced.²⁷ Nevertheless, the overall situation required an official response from the Church.

In early 1616 the Church prepared to issue a decree condemning the heliocentric theory as contrary to Scripture and hence heretical.²⁸ But before the release of this decree Pope Paul V instructed Cardinal Bellarmine to meet with Galileo to make the Church's case clear. The Cardinal warned Galileo privately that he should follow the decree and refrain from further support of the Copernican theory, with the understanding he becomes liable to the Inquisition if he refuses.²⁹ Within weeks of this meeting the decree is published condemning the Copernican theory, suspending Copernicus's *Revolutions*, and banning other books *but* neither Galileo nor his writings are mentioned! For all intents and purposes Galileo was not directly linked to the Church's decree. However, Galileo's story does not end here though the ramifications of the preceding events will not surface for almost twenty years.

It appears Galileo held to what is called the "independence principle" while Bellarmine (and the Church at large) adopted the "limitation principle." The former stance simply held that scriptural references that appear to be factual statements regarding natural phenomena are of no value "for salvation and, therefore, can be revised or even dismissed on scientific grounds." The latter position understands that such factual statements in Scripture—even if referring to natural phenomena—are "necessary for their salvation value, and therefore, cannot be revised [even] in light of any contrary scientific theories." Thus, one may consider a theory such as the heliocentric proposal but only suppositionally. Such a theory could be used to systematize observations or make calculations but under no circumstance should any such theory be considered true or of value for understanding reality.³⁰

²⁴ Ibid., 24.

²⁵ Finocchiaro, *Galileo Affair*, 300.

²⁶ See *ibid.*, 333 n. 45, and 334 n. 4.

²⁷ The lack of conclusive proof from Galileo is a weakness that dogged him throughout the years; Schirmacher, "The Galileo affair," n.60.

²⁸ Finocchiaro, *Galileo Affair*, 148-150.

²⁹ Blackwell, *Science, Religion and Authority*, 33-34; see Finocchiaro, *Galileo Affair*, 36-37.

³⁰ Pera, "The god of theologians," 367.

Not to be overlooked in our discussion is the 1616 meeting between Galileo and Bellarmine mentioned above; it has become a source of intrigue for historians. According to the Inquisition minutes of this meeting Galileo agreed to abandon his position that heliocentrism is true.³¹ A follow up letter (which we do not have) of Bellarmine to Galileo summarizing their meeting appears only to report the Cardinal’s relaying the impending decree condemning Copernicanism because it “cannot be defended or held.”³² But as far as can be determined nothing in the letter (contrary to a report at the 1633 trial; see below) mentions any strict injunction put on Galileo, thus indicating that he is free to refer to the heliocentric theory in terms of a supposition. Shortly thereafter the Cardinal writes a public declaration (in response to rumors that Galileo had been formally charged with wrongdoing) absolving the scientist of any misconduct; this declaration or certificate contains no specific prohibition against holding a suppositional appreciation of the heliocentric theory.³³ Moreover, between Bellarmine’s private letter to Galileo and his public certificate, Galileo and the Pope have a cordial meeting, further indicating that the scientist’s position—at that time—was not in danger and he remains free to pursue other scientific interests.³⁴

The next 15 years or so saw Galileo essentially stay out of harm’s way. Part of this lull was due to his close association with Cardinal Maffeo Barberini, who would become Pope Urban VIII in 1623. The two met six times over the course of six weeks in 1624, discussing the “hypothetical” Copernican theory without any conflict.³⁵ From his friendship with the Pope Galileo apparently felt he could write about the pros and cons of both the geocentric and heliocentric theories, as long as he did not promote the latter. In 1624 Galileo began working on his *Dialogue Concerning the Two Chief World Systems*, which was completed he 1630. The book, cast in the form of a dialogue between three participants, appears to be a formal discussion of the geocentric and heliocentric theories. The Church authorities granted the imprimatur for the book and after several delays and intense negotiations, *Dialogues* was published in 1632.³⁶ However it became apparent to some the Copernican theory gets the better of the argument in Galileo’s book. This understanding is what led to the 1633 trial of Galileo.

Although the book was well received in scientific circles, a report (supposedly) of the Inquisition’s proceedings in 1616 concerning Galileo was discovered.³⁷ In it were specific demands of Galileo to refrain from holding and teaching the heliocentric theory; this injunction clearly prohibited any discussion—even hypothetically—whatsoever of the theory, either orally or in writing. According to this “special mandate” *Dialogues* was in direct violation of the 1616 decree. This injunction was unknown to Church officials—including Urban VIII—at the time the

³¹ Finocchiaro, *Galileo Affair*, 148.

³² Blackwell, *Science, Religion and Authority*, 34.

³³ Finocchiaro, *Galileo Affair*, 153; it seems reasonable to assume that Bellarmine’s public support of Galileo reflects his private letter to the scientist.

³⁴ *Ibid.*, 152.

³⁵ Blackwell, *Science, Religion and Authority*, 35.

³⁶ Finocchiaro, *Galileo Affair*, 34.

³⁷ *Ibid.*, 147-48.

book was published; we can only conclude that Galileo never mentioned the edict to the Pope in their conversations.³⁸ Nevertheless, in 1632 the Pope took the unusual step of appointing a preliminary committee to investigate whether to proceed with a trial before the Inquisition.³⁹ The committee's findings left Urban with no choice but to forward the case to the Inquisition. Galileo is summoned to Rome but because of negotiations and Galileo's ill health this demand is forestalled. Eventually, under threat of arrest and forcible transport to Rome, he ultimately makes the trip to the Imperial city in early 1633.⁴⁰

The trial that followed focused on Galileo's ignoring the prohibition of 1616, a charge he countered by relating that he never received any special instructions from Bellarmine to refrain completely from discussing the heliocentric theory; that it was—in his mind—permissible to discuss the theory in hypothetical terms though it should not be held or defended. He even produced the Cardinal's certificate of 1616 to substantiate his case.⁴¹ This piece of evidence produced mixed results for Galileo. On the one hand, the Inquisition was not persuaded that Galileo wrote *Dialogues* for any reason other than to promote Copernicanism. On the other hand the certificate may have caught the Inquisitors off guard and led to what could be called an “out-of-court settlement.”⁴² The Court could have pursued the charge of “formal heresy,” a judgment that was consistent with the tone of the trial: Galileo intentionally and knowing ignored the 1616 prohibition. But a lesser though still serious charge of “vehement suspicion of heresy” was the final verdict.⁴³ The lesser charge states that Galileo admits that the *Dialogues* support the Copernican theory though that was never his intent. During the trial he had admitted that upon rereading *Dialogues* he could see how one could come away with a picture that the book favored Copernicus. His error had been “one of vain ambition, pure ignorance and inadvertence.”⁴⁴ In the end Galileo accepts the Inquisition's offer of a lesser charge and signs a statement to that effect. In his statement he rejects the heliocentric theory and swears never again to defend it orally or in writing;⁴⁵ in addition *Dialogues* is banned.

What is fascinating is that the minutes of the trial reveal that its focus is *not* a detailed counterargument against evidence supporting Copernicus, or a discussion of proper biblical interpretation or even a scientific proof of the geocentric theory.⁴⁶ Rather, the focus is on how Galileo used *Dialogues* to support the “Copernican heresy” in defiance of the Church's decree of

³⁸ Such an omission may have stemmed directly from Galileo's understanding from Bellarmine and the Pope that he had some leeway in how he expressed his “hypothetical” theories.

³⁹ Finocchiaro, *Galileo Affair*, 35-36.

⁴⁰ Perhaps the insistence of the Inquisitors for an ill Galileo to travel to Rome was a form of penance; Finocchiaro, *Galileo Affair*, 36.

⁴¹ Unfortunately for Galileo, Cardinal Bellarmine died in 1621.

⁴² Finocchiaro, *Galileo Affair*, 37.

⁴³ Only seven of the ten Inquisitors on the Court signed off on this decision. Does this imply there was not sufficient evidence even to support the lesser charge? Or was the lack of unanimity based on a desire for the more serious charge of formal heresy?

⁴⁴ Finocchiaro, *Galileo Affair*, 278.

⁴⁵ *Ibid.*, 292.

⁴⁶ *Ibid.*, 256-293.

1616. Point after point is made that builds the case that despite his denial to the contrary, the accused sought to destroy the geocentric theory and validate and promote heliocentrism. Augustine's guidelines for biblical interpretation are never mentioned though the Inquisitors refer to him to show how any form of imparting knowledge is equivalent to teaching one's beliefs.⁴⁷ In short Galileo's trial of 1633 is simply about disobeying the Church's ban on the teaching of the heliocentric theory of astronomy. The issue concerning how to interpret Scripture that is challenged by scientific evidence was decided in 1616; the 1633 decision is simply about defying the Church's authority.⁴⁸

Upon acceptance of the Inquisition's offer, Galileo is sentenced to house arrest though he is eventually allowed to return to his home in Arcetri near Florence. Galileo lives under house arrest there until his death in 1642. He does write the book *Two New Sciences* in 1638, which lays the foundation for future generations to provide greater proof regarding the earth's motion.⁴⁹

In effect one would think the 1633 trial and sentence would end the "Galileo affair"; but in actuality, the affair entered a new phase, one that has lasted almost 400 years. This ongoing chapter of the affair has no doubt been intensified by the following events: the building of a mausoleum for Galileo in 1734; the removal of the ban on *Dialogues* in 1835; Pope John Paul II's admission in 1979 that Galileo suffered unjustly; and the Pontiff's 1992 remark that the Church of Galileo's day was in error.⁵⁰

Lessons from Galileo

Our task now is to highlight some lessons we can learn from our brief look at the Galileo affair, so as not only to see what this 17th century episode can teach us but also to lay a foundation for our look at the present relationship between the Sciences and the Humanities.

Things are not always as they seem. We opened our discussion of the Galileo affair by noting how it has often been designated as the first occurrence of the heated dispute between science and religion. My hope is that our preceding discussion has cast doubt on that assertion and has laid the groundwork for addressing the idea of oversimplification regarding the dispute between the Sciences and the Humanities.

Our brief examination of the quarrel reveals that is it a misreading—if not misleading—to use Galileo's trial as a source for saying that science and religion have been at odds since the early part of the 17th century. To begin with, we should recall that the basis for experimental science is the foundational belief that a rational God created an ordered universe that could be observed and understood by rational human beings. Pioneers such as Roger Bacon, William of

⁴⁷ Augustine's commentary on Psalm 118 is cited. As Galileo's adversaries write at the trial, teaching or learning is never "easier than when doctrines are expounded by means of a dialogue, as is well known from countless examples of great men"; *ibid.*, 265.

⁴⁸ A discussion for the reasoning behind both decisions will follow in our look at our next section, "Lessons from Galileo."

⁴⁹ The irony of this publication has not been lost on Finocchiaro, *Galileo Affair*, 39.

⁵⁰ Not all are convinced the Church has done enough to rehabilitate Galileo's name; see McMullin, *The Church and Galileo*.

Occam and Francis Bacon were Christians who conducted research, spurred on by their religious beliefs and confidences.⁵¹ Alfred North Whitehead observes that the origin of science required Christianity’s “insistence on the rationality of God.”⁵² Let us not forget that our discussion of Galileo was at most talking about astronomy not all of science (limited though it was at this time).⁵³

For another thing, we saw that not all Catholics were anti-science. The Jesuits held to the Copernican theory (see note 13). Theologians Thomas Campanella (see below) and Paolo Antonio Foscarini defended Galileo’s right and need to conduct his research as a Christian. More so, we must not forget that the Protestants also were open to science. Kepler was a Protestant and it was the Lutherans who not only encouraged Copernicus to publish his *Revolutions* but actually subsidized the undertaking.⁵⁴ Thus, we should not lump all of Christianity together as opposed to the results of scientific research.

Campanella desired to unify science and religion into “one culture.”⁵⁵ Such a goal seems to have been fulfilled in many today. For instance John Polkinghorne, Alister McGrath, and Francis Collins are Christian scientists I have read and admired in that they have reflected the worldview that all truth is God’s truth and do not view that science and religion contradict each other.⁵⁶ Yet, one might ask that if there is a segment that seeks harmony why is there such a hostile climate between science and religion, especially in America? I think the answer lies in the somewhat parallel situation of Galileo. During that time the Inquisition—bolstered by the Church hierarchy—held the power and imposed its will on its followers in Catholic countries. That is, Church leaders had the means to dominate when proclaiming their position. Today outspoken authorities (from both sides) set the tone and promote their agendas in a similar fashion; the extremists (fundamentalists of both disciplines) fan the flames and get the most attention.⁵⁷ From the atheist scientist Richard Dawkins’s cry that religion (in particular Christianity) is “one of the world’s greatest evils”⁵⁸ to Phillip Johnson’s inflammatory declaration that evolutionary theory is “fundamentally atheistic,”⁵⁹ it is hard to hear the voice of the moderate middle; any voice seeking to move forward in partnership does not carry as much

⁵¹ Schmidt, *How Christianity*, 219-231; Nield, “Scientific Revolution.”

⁵² Alfred North Whitehead. *Science and the Modern World* (New York: MacMillan, 1926), 18, quoted in Schmidt, *How Christianity*, 219.

⁵³ Even today not all of science (e. g., physics) is hostile toward religion; see Rolston III, “Science and Technology.”

⁵⁴ Butterfield, *The Origins*, 69-70; Schmidt, *How Christianity*, 226.

⁵⁵ Blackwell, *Science, Religion and Authority*, 20-23.

⁵⁶ Polkinghorne, *Exploring Reality*; McGrath, *Open Secret*; Collins, *Language of God*; I do not want to give the impression that only Christians seek to produce harmony in this debate. I have found Michael Ruse, who I take it to be an atheist, as one seeking to promote peace between the two cultures; see his work *Evolution-Creation Struggle*.

⁵⁷ As Peter Berger points out, extremists in both camps “fight in public places—in the political arena in particular—where they can cause considerable harm,” *In Praise of Doubt*, 97.

⁵⁸ Dawkins, “Is Science a Religion?” 26.

⁵⁹ Johnson, *Darwinism*.

weight as those seeking to impose their individualistic will on the public. It seems that the battle for authority brings out the worst in us.⁶⁰

The real issue of a debate is not always apparent. As our discussion above revealed, the condemnation of Galileo at his 1633 trial was not that science is evil and religion is good: the issue was that he had unintentionally (intentionally?) promoted the heliocentric position over and above the geocentric position, in defiance of the Church's 1616 decree. Furthermore, even the edict was more about perceived challenges to Church authority than the threat of science over and against religion. And this brings us to the crux of the matter.

The real issue, as I see it, in the Galileo affair was not science versus religion but the challenge of who has the final say on interpretation of Scripture. This is not to say that this particular challenge was not instigated by scientific research: it clearly was. But science itself was not the reason for the confrontation. After all, Martin Luther's confrontation of the Church's position on indulgences was not based on science. Nevertheless the Church reacted in aggressive fashion in its condemnation and pursuit of Luther. Taking this thought one step further we can see the context in which Galileo pursued his research: the Roman Catholic Church was "under siege" regarding its authority as the true Body of Christ. When Luther nailed his 95 theses to the door of the Wittenberg Church he set in motion what became known as the Reformation—or in reality reformations—throughout Europe.⁶¹ In particular, the dispute was over who had the final say on how to interpret Scripture.⁶² A major reaction to the Reformation was the Council of Trent (1546-1563). In the Fourth Session in 1546 the Council decreed that in order to "control petulant spirits... in matters of faith and morals" no one can hold any interpretation of Scripture "contrary to ... the Holy Mother Church."⁶³ Luther's protest was mimicked—a one sense—by Galileo. Both the 16th century theologian and the scientist a century later confronted the Church by asking the following questions: Who has the final say when interpreting Scripture? Was it the Church, with its 1500 years of tradition handed down by Popes and Councils? Or was it the individual backed by conscience and evidence? In light of what happened post-1517 the Church was protective of and sensitive to any challenge to its authority.

In a previous Round Table paper, I discussed authority as the real area of disagreement in the present science and religion debate.⁶⁴ In one sense the Galileo affair was an omen. But "heresy" was not limited to scientific research, as we have seen.⁶⁵ It is the overarching idea of "turf wars" that propels Galileo to forefront of the contemporary science and religion debate.

Simply put, science takes its authority from observation and rational interpretation, while religion derives its right to have the final say based on revelation in a sacred text. This sparring is much more so in today's world than in Galileo's day because science has become

⁶⁰ By authority I mean the perceived power and ability to speak and act for the betterment of society.

⁶¹ McGrath, *Christian Theology*, 43-64.

⁶² In particular Romans 1:17; see also Blackwell, *Galileo, Bellarmine, and the Bible*, 12.

⁶³ *Ibid.*, 11-12.

⁶⁴ Menninger, "Can Science and Religion?" 4-5.

⁶⁵ It is ironic that Bellarmine had one of his writings placed on the Index in 1590 by Pope Sixtus V. Blackwell, *Galileo, Bellarmine, and the Bible*, 30.

institutionalized. But the issues at stake are the same: Who gets to call the shots? Who gets to promote their worldview?

Worldviews: perception is everything. Hopefully, I have made my case for reexamining the Galileo affair. Yes, it did involve science and religion. But (1) not all scientists were anti-religious and not all theologians were anti-science; this holds for today; and (2) authority—not the disciplines themselves—was the driving force in the day of Galileo; likewise it is the force behind much of hostility in our time. What then can be said about all of this in light of the title for this article? To answer these questions we need to briefly examine the concept of worldview or *Weltanschauung*.⁶⁶

Our worldview is how we see things. In formal terms, a worldview is our inner commitment to how we understand reality, the basic framework within which we interpret life's experiences and mysteries.⁶⁷ These interpretations help identify and articulate what we hold to be true. Our worldview—based on presupposition—is expressed both in beliefs and values, and in our actions. Put another way, it is by our worldview that “we live and move and have our being.”⁶⁸ When I am asked to express my position on certain topics (e. g., the theme of this Round Table) I am unconsciously using my worldview to interpret for my conscious mind what I think needs to be said or to express how I agree or disagree.⁶⁹ My words of this paper will reveal certain beliefs and values and will reveal the presupposition that guides my thinking. Moreover, I may fall short of following my principles, as the threat of infringement may lead me to react in a way that is inconsistent with what I say I believe.⁷⁰ This point is to say that we live between the ideal worldview (what I can articulate) and the tangible worldview, the one you see me live out before your eyes. Yet despite any inconsistencies it is beneficial to investigate our worldview.

There are fundamental questions to ask when determining one's worldview. Some of these questions are: Is there a God or not? Is the world created or autonomous, here by design or simply by chance? Are human beings made in the image of God or are we an accident of evolution? Is there an objective standard to measure our actions as to right or wrong, or do we create our own standards?⁷¹ As one answers these questions and identifies “where one is coming from” it is only natural and beneficial to look away from oneself and compare our worldview to that of others. This is important as we consider the task at hand.

When considering the current science and religion debate our discussion leads to the issue of different worldviews. That is we ask, is the current hostility in the public square due to differing worldviews alone? Or have some persons simply allowed differences—some of which are unavoidable—to develop into hostility? What I am getting at is this: must different

⁶⁶ An extremely helpful book regarding the history of the term is Naugle, *Worldview*.

⁶⁷ Westerholm, *Understanding Matthew*, 21-22.

⁶⁸ Sire, *Universe*, 245.

⁶⁹ Sire, *Elephant*, 19.

⁷⁰ This is when the issue of authority can cloud a person's integrity regarding worldviews; Sire, *Universe*, 245.

⁷¹ Sire, *Elephant*, 20.

worldviews—even atheistic and theistic—always result in conflict? My position is no.⁷² To be sure the atheistic evolutionist and the theistic evolutionist will differ on perhaps the most fundamental of all worldview issues, belief in God and a created universe; such differences are clearly grounds for passionate debate. And as has been noted, such exchanges can become acrimonious, leading to the simple conclusion that science and religion have opposing worldviews.⁷³ But don't both sides (naturalists and theistic evolutionists) value seeking truth through the acceptance of evolutionary theory? In addition, no matter the conclusion on why we are here, both camps place worth on humans as they earnestly and tirelessly seek to alleviate suffering, eradicate disease and make this world a better place to live. In other words, different answers to the more fundamental of questions have blinded people to the areas that are shared. This is all to say even the current science and religion debate is not necessarily the result of hostile worldviews. People have been led to believe that certain worldviews are incompatible. But I offer that diverse worldviews, while differing acutely in some fundamental areas nevertheless are not—as I see it—incapable of partnership. The issue of authority (and credibility) dominates the discussion, as does the concomitant desire for independence.⁷⁴

But what do we do with those who basically hold the same worldview yet interpret the same phenomena differently? For instance, two people might answer the question about the reality of God in identical fashion: yes there is a God who has created an ordered universe, climaxing with the appearance of the human race. But did the world as we know it today evolve over billions of years? Or is it the product of a direct creation of 10 000 years or less? While such differences are not unimportant nonetheless those who seem to hold almost identical worldviews fixate on whether one is a progressive (essentially evolutionary) or special (young earth) creationists and considered the other a sworn enemy.⁷⁵

This last idea of interpreting the same phenomena differently while holding to similar worldviews is what we saw with the Galileo affair. Both the Catholic Church and Galileo held to a belief in God and a reverence of Scripture, and to a certain extent both valued science. Moreover Cardinal Bellarmine conceded that scientific evidence might eventually prove that holding to a literal interpretation of the Bible could prove to be difficult in certain situations. But despite similar worldviews, Galileo and the Church differed deeply on how one should interpret the “sun rising and setting.” The former looked to his scientific evidence to reject the geocentric model; the latter exercised its authority to protect the validity of that model. Clearly, Galileo and the Church did what many of us are tempted to do: “We do tend to adopt positions that yield power to us, whether true or not.”⁷⁶ After all is said and done we can see that the issue of

⁷² Netland remarks that there are no such things as “incommensurable” worldviews; *Encountering Religious Pluralism*, 285-289.

⁷³ See Craig and Stinnott-Armstrong, *God?*

⁷⁴ Cohen, “On the Historical Relationship,” 291.

⁷⁵ Moore, “Creation/Creationism.”

⁷⁶ Sire, *Universe*, 245.

authority raises its head both among those who encounter each other with different worldviews as well as those who—for the most part—work side by side with similar worldviews.

Having offered these lessons from Galileo, what should be done now? In other words, does the preceding discussion apply to our present Round Table topic? And if so, what can we learn from that application? With these questions in mind, we will now focus on the topic of our Round Table.

The Two Cultures: Friends or Foes?

We recall C. P. Snow's lament that society consisted of two cultures, namely scientists and non-scientists (e. g., literary intellectuals). The problem was that "between the two [exists] a gulf of mutual incomprehension—sometimes (particularly among the young) hostility and dislike, but most of all lack of understanding."⁷⁷ Though both sides were guilty of a lack of communication with the other, Snow is almost consumed with the failure of the intellects to appreciate and grasp the significance of science for the survival of western civilization as well as development of underdeveloped countries. He views the literary intellectuals as "tone deaf," "ignorant specialists," and having "about as much insight into [science] as their Neolithic ancestors would have had."⁷⁸ Is Snow's concern for a society divided into two cultures justified in our day? Stefan Collini argues that the polarity has subsided and is more accurately described as a "continuous spectrum."⁷⁹ However, Stephen Jay Gould says Snow's position is incorrect—and worse—parochial.⁸⁰ Such opposite conclusions require an examination—though all too brief—of how our preceding findings relate to the topic of this Round Table.

What I propose to present in this final section of my paper are guidelines for promoting a working—if not partnering—relationship between the Arts and Humanities, and Science and Technology. In examining our two cultures my goal is to offer guiding principles that hopefully prove fruitful to those on either side of the aisle.

Avoid generalizations. We learned this in our look at the Galileo affair and the same appears with C. P. Snow. I view Snow as oversimplifying the situation when he equates the literary intellectual sector with all of the non-scientific culture (e. g., "traditional culture.")⁸¹ This interchange of terms implies that all of the non-scientific culture is essentially anti-scientific.⁸² This was not true in Galileo's day and it is not true in our time.⁸³ To be sure there will always be somewhat of a "gulf" between the two cultures. Each sector will focus on its particular subject. All this is to say that the difference in the cultures may partially be due to unavoidable diversity

⁷⁷ Snow, *Two Cultures*, 4.

⁷⁸ Snow, *ibid.*, 14-15.

⁷⁹ *Ibid.*, liv-lv.

⁸⁰ Gould, *Hedgehog*, 90.

⁸¹ Snow, *Two Cultures*, 11.

⁸² Kimball, "Two Cultures," 13.

⁸³ As early as 1960 there were universities promoting History and Philosophy programs aimed at narrowing the gap between science and the humanities; see Cohen, "On the Historical Relationship," 294 n. 17; furthermore, Vatican II, though clearly not composed of scientists, supported the use of science; see Pera, "The god of theologians," 377.

and purpose. However, such acknowledgements need not lead to oversimplification and the emphasizing of some differences to the extent that commonalities and partnering are considered nonexistent and unthinkable respectively.

There will always be different issues and values between the Arts/Humanities and Science/Technology. Such differences stem from different interests, methods and goals. But as one in the Humanities do I not depend on science and technology to develop transportation which allows me to travel to this Round Table, to provide a powerpoint to present my thoughts, and to utilize email to remain in contact with other members of this gathering? More importantly, I look to science to tackle major problems such as overpopulation, overconsumption and under distribution.⁸⁴ Thus it is clear to me that the Humanities require the Sciences. Can the converse be said?

That question presents difficult challenges. On the one hand, science can “do science” without outside interference, as seen in the events played out in stem cell research in the USA. On the other hand, are the risks of implanting stem cells worth the possible effects of research gone awry? Must I not require that science seek to answer the questions of how to use its knowledge and power? This thought is especially acute when the possibility looms that science will produce technology that may fall into the hands of those who would dominate and oppress for the purpose of imposing their wills on others. As Polkinghorne has remarked science should not do something just because it can.⁸⁵

Holmes Rolston makes an interesting statement when he writes, “Nothing in science ensures against philosophical confusions, against rationalizing, against mistaking evil for good, against loving the wrong god.”⁸⁶ On the surface this in itself is a generalization as there are many in the Sciences who see that their research must be guided by a moral standard or Being. But moral guidance of and articulate presentations for science and technology in the public square would both help promote what is acceptable in the realm of ethics and morals regarding science, as well as aid in educating people as to what is good and beneficial from scientific endeavors. Perhaps a clear case for what science should and should not do is part of what we should be about. We should not let the extremists in either camp drive a wedge between us so as to prevent us from making this world a better place. Yes, there will always be battles over budgets, policies, etc., which clearly evoke emotional and passionate arguments and these will inevitably lead to tensions and disagreements. But intense debate should never compel us to “leave the table” convinced that the other side is unreasonable and any thought of working together is impossible. Although we will disagree with others, dissimilarities should not become reasons to cast everyone in the other camp as our opponent. Such is not only unfair; it is unwise in a world that sits on the brink of self-destruction.

Identify the real issue. It has not gone unnoticed that Snow had a fear that Communism (e. g., USSR) would make primary inroads into poor countries, thus establishing a beachhead to

⁸⁴ Rolston III, “Science and Technology.”

⁸⁵ Polkinghorne, *Exploring Reality*, 147-148.

⁸⁶ Rolston III, “Science and Technology,” 37.

the disadvantage of the West.⁸⁷ Moreover, Snow's desire to spread the merits of science and technology in order to help underdeveloped countries suggests to me that for him the morality of scientific progress is not judged by standards of right or wrong but whether a country can measure an improvement in material gain and in the quality of living.⁸⁸ That is, he was not concerned simply to bring the two cultures together in and of themselves. Rather, part of his motivation for his stand was to encourage—guilt?—the nonscientific culture into accepting his optimism for science to solve our problems.

These observations are not to imply that Snow was wrong for his passion. Hardly. If we cannot argue vigorously for our beliefs then why should anyone else pay attention to us? But we should step back and evaluate our worldview in order to identify all the components of our position. Issues of authority, public image, fears and threats (perceived or real) unconsciously shape our rhetoric and contribute to the decisions we make. To recognize all that goes into who we are and what we stand for is an ongoing process. It is not unacceptable to discover we have ulterior motives but it should be unacceptable to fail to examine ourselves closely to see what is selfless and what is self-protective. Perhaps in doing so, I can better appreciate the other person's position and in the process improve my contribution to the discussion.

Develop an irenic worldview. The need to understand our worldview, while time consuming as well as somewhat intimidating, is imperative to understanding ourselves and those around us. Without such knowledge possibilities for dialogue, partnership and meeting the challenges of a chaotic world are next to nothing. But if we are committed to making this world a better place we really have no choice. We can all contribute something but we cannot make the impact we could without the help of others whether they are part of our immediate culture or not. With that thought in mind I would like in closing to offer some suggestions on what constitutes a worldview that is useful, productive and beneficial to us and those around us.

First, my worldview should be subjectively satisfactory.⁸⁹ Simply put, our worldview must meet the need to know the truth. To think otherwise undercuts the usefulness and effectiveness of the “world as we see it.” To be sure our knowledge is personal (though this does not mean it is not objective) and partial.⁹⁰ But surely what we articulate concerning reality satisfies our need to know something about the truth. Why seek the answer to the big questions of life, if—when we reach some conclusion—we doubt we are any closer to the truth than when we started our search. If uncertainty assails our personal beliefs that much, then maybe we need to rethink and restate our worldview. While I can never be 100% sure of the truthfulness of my worldview I still should receive the contentment that I have committed myself to something I can offer to others as a system of belief of which I am more convinced that it is true than it is not.⁹¹

⁸⁷ Snow, *Two Cultures* 29-40; Dizikes, “Our Two Cultures,” characterizes Snow's lecture a “cold war document.” 2.

⁸⁸ Snow, *Two Cultures*, 41-51.

⁸⁹ Sire, *Universe*, 247-48.

⁹⁰ Polanyi, *Personal Knowledge*, vii-viii.

⁹¹ Wilkins and Moreland, *Jesus Under Fire*, 8.

Second, I should undertake a public articulation and intentional examination of my worldview with a humble spirit. Despite the contentment from believing what I hold to be essentially true, I must constantly remind myself that I do not know all there is to know (and would not know if I did!). In addition, I must keep in mind that what is “self-evident” to me is not as such to others, even if we participate in the same culture. The beauty of a gathering such as this Round Table is the opportunity to learn and know where I stand all the while realizing that my fellow participants are co-travelers on a pilgrimage toward the truth. C. P. Snow’s emphasizing of tensions between the two cultures—the Arts and the Sciences—reminds us of our need to dialogue honestly and lovingly, with the intent to learn about each other and ourselves. Oh that those in Galileo’s day had heeded this direction!

Third and finally, my worldview must contribute to the common good of those in “my kingdom,” that is, those I influence.⁹² When I teach a course about ethics invariably my first lecture will introduce modernism, postmodernism, theism, naturalism—just to name a few. That is, in establishing the importance of ascertaining one’s worldview, some options and aspects must be identified. But a key component of this investigation is what to do with the “other-ist” who holds to an “other-ism,”⁹³ those we do not agree with or—unfortunately—do not get along or dialogue with (Snow’s point indeed!). Instead of making it my priority to convince the “other-ist” I am right (though genuine dialogue can include the desire to change the other-ist’s mind)⁹⁴ I must remind myself first of all that no one is immune to the troubles and challenges of life. Earthquakes, economic downturns, illnesses, broken families, depressions, suicides, all these befall those we agree with and those we do not. To paraphrase a point made in a recently read article, “We may not be able to provide warmth to a cold “other-ism” but we must wrap a warm blanket around a shivering “other-ist.”⁹⁵ And perhaps in the end this is the greatest evidence of the truth of my worldview.

Hopefully it is apparent that I see potential for the complementary partnership between the Humanities and the Sciences, both for alleviating suffering (physical and spiritual) and, ultimately, improving the quality of life for all. This was not the case for the Catholic Church and Galileo in the early 17th century. And I am afraid such a negative mindset prevails in some sectors of our world today. May we see indeed that we do not have opposing worldviews; furthermore our differences are more perceived than real. We must stand for what we believe is true, honor the dignity of those who disagree with us and seek to work together to make this world a better place, both for our generation and those to come.

⁹² Willard, *Knowing Christ Today*, 160.

⁹³ A natural-ist holds to natural-ism, a the-ist to the-ism, and so forth.

⁹⁴ Menninger, “Pluralism and Particularism?” 401-405.

⁹⁵ Chan, “Sowing Subversion,” 47.

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